

DEVELOPMENTS

THE NEWSLETTER FROM PACKET FORENSICS COVERING INDUSTRY AND PRODUCT EVOLUTION

You've got a Man in the Middle

An automated Approach to Intercepting Traffic in encrypted Tunnels

Internet communications are increasingly being protected by transport layer security ("TLS") or the secure socket layer ("SSL"). These are simple ad-hoc virtual private networks protected by encryption. They operate at the transport layer, usually over TCP. Once used exclusively by web servers to protect transactions, these technologies are now also used to protect e-mail access, voice over IP telephony and even entire Internet connections.

This pervasive adoption has created major problems for lawful interception and technical investigations because intercepting this traffic has traditionally resulted in capturing nothing but unreadable fodder.



There have been a slew of "attempted solutions" in the recent past that made intercepting some of this traffic possible, but all previous attempts failed in the areas of reliability and complexity of setup--this often resulted in the accidental disruption of subscribers' communications all together, an unacceptable risk for most of us. As if that wasn't bad enough, most attempted solutions involved specific application-layer protocols and were tied to those protocols. This meant they worked with web, but not with VoIP and so on... All things considered, *the juice wasn't worth the squeeze.*

After much effort, we're excited to offer a solution that doesn't suffer from these previous limitations. Our solution does just what you'd expect: you can see inside encrypted tunnels and capture whatever traffic is being protected--web, e-mail, voice over IP, et al, regardless of the port numbers or protocol being tunneled. It works with all our existing targeting and policy features and there's even a wizard to configure it through our graphical management software.

WAYS AND MEANS

Contrary to what many believe, interception of communications protected with high-assurance cryptography isn't always about defeating or cracking the encryption--it's usually about getting the encryption keys yourself so you can decrypt at-will and therefore the encryption doesn't matter. This applies generally to both standalone encrypted materials and communications encryption.

On the topic of TLS and SSL, this is accomplished by way of a "man-in-the-middle" or "bucket brigade" attack. In its simplest form, a device '**E**' is placed somewhere in between the communications network connecting '**A**' to '**B**' and it becomes an unintended go-between, speaking to **A** and **B** independently while relaying information between them--of course that information is first subject to its purview. When an encrypted tunnel is negotiated, instead of creating a tunnel between **A** and **B**, two tunnels actually get created--one from **A** to **E** and another from **E** to **B**. When done correctly, **A** and **B** are made to believe they are directly connected over an encrypted tunnel and the information transmitted between them is cryptographically secure. All the while, **E** sees all.



Technical Details

Man-in-the-Middle Capabilities

Intercept any communication within Secure Socket Layer (SSL) or Transport Layer Security (TLS) sessions

All Packet Forensics targeting and policy capabilities can operate within the encrypted tunnel

Operational Configurations

In-line with hardware bypass / failsafe

Import any certificate / public key or generate your own for presentation

Availability

Available in firmware releases after August 31st, 2009 for all Packet Forensics platforms

Available under customization program

Contacts



Offices in
Virginia and
Arizona, USA

Headquarters

420 S Smith Rd
Tempe, AZ 85281
United States of America

Telephone & E-mail

Domestic US +1 (800) 807 6140
International +1 (757) 320 2002
salesteam@packetforensics.com



PACKET FORENSICS

HOW DOES IT WORK?

Deployment and Capabilities

Just as it sounds, engaging in a man-in-the-middle attack requires the interception device to be placed in-line between the parties to be intercepted at some point in the network. This could be at the subscribers' telecom operator or even on-premises, close to the subject. Packet Forensics' devices are designed to be inserted into and removed from busy networks without causing any noticeable interruption. Even the failure of a device due to power loss or other factors is mitigated by our hardware bypass fail-safe system. Once in place, devices have the capability to become a go-between for any TLS or SSL connections in addition to having access to all unprotected traffic. This allows you to conditionally intercept web, e-mail, VoIP and other traffic at-will, even while it remains protected inside an encrypted tunnel on the wire. All the same capabilities as other Packet Forensics products are still available, including the ability to extract pen/trap details only.

Technical Considerations: PKI

Using "man-in-the-middle" to intercept TLS or SSL is essentially an attack against the underlying Diffie-Hellman cryptographic key agreement protocol. To protect against such attacks, public key infrastructure ("PKI") is often used to authenticate one or more sides of the tunnel by exchanging certain keys in advance, usually out-of-band. This is meant to provide assurance that no one is acting as an intermediary. Secure web access (HTTP-S) is the best example of this, because when an

unexpected key is encountered, a web browser can warn the subject and give them an opportunity to *accept* the key or *decline* the connection.



To use our product in this scenario, users have the ability to import a copy of any legitimate key they obtain (potentially by court order) or they can generate "look-alike" keys designed to give the subject a false sense of confidence in its authenticity.

Of course, this is only a concern for communications incorporating PKI. For most other protocols riding inside TLS or SSL tunnels—where no PKI is employed—interception happens seamlessly without any subscriber knowledge or involvement.

HOW CAN YOU USE IT?

Government Security

IP communications adoption dictates the need to examine encrypted traffic at-will, especially transiting government networks.

Investigations

Your investigative staff will likely collect its best evidence while users are lulled into a false sense of security afforded by web, e-mail or VoIP encryption.

Product Testing and Evaluation

All network products should be tested diligently for phone-home capabilities with encryption.

DEVELOPMENTS

THE NEWSLETTER FROM PACKET FORENSICS COVERING INDUSTRY AND PRODUCT EVOLUTION

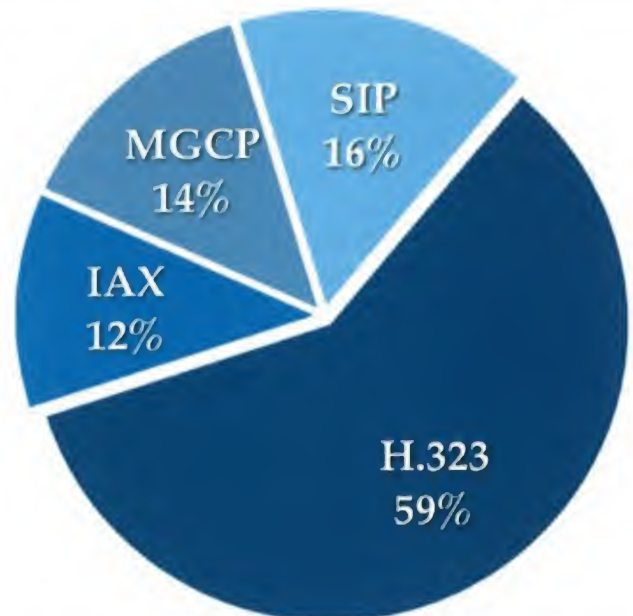
Private VoIP Exchanges & the IAX Dilemma

Explosive Growth of IAX Protocol and International VoIP Trunking Leaves Industry Unprepared

In June of 2009, Packet Forensics undertook a comprehensive research effort with the help of one of our partners, a global telecommunications service provider. Their network represents a large cross-section of the greater North American IP backbone because they are a tier-1 Internet service provider, or to what people commonly refer as a carrier's carrier. Amongst a larger agenda, we sought to unearth quantitative details related to actual VoIP protocol usage—what are people using to transport VoIP traffic and are they trunking to several large carriers or is there a preponderance of peer-to-peer traffic or interconnectivity between PBXs and providers. What we found not only surprised us, but warranted immediate action on our part to fill gaps in our product portfolio and to inform our current customers who rely upon us for passive VoIP monitoring and interception.

In order to preserve subscriber privacy, deep packet inspection (DPI) was used only to positively identify protocols and because of privacy sensitivity, we did not determine if calls were being executed independently or trunked. Traffic flow records were analyzed to identify statistically significant networks of call origination and termination and to get a sense of which protocols were being used in which telephony situations.

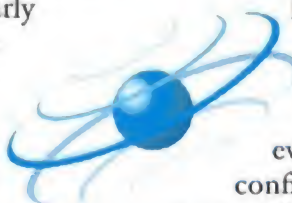
The high level results of the analysis provided unexpected answers and insight. First, MGCP is still used across the public Internet, not only within enterprises. Second, H.323 remains the heavy-lifter for teleconferencing. Finally, Inter-Asterisk Exchange (IAX) protocol now comprises a double-digit percentage of VoIP. This is particularly interesting when you consider IAX traffic occupies only one stream for potentially dozens of calls when trunking. Consider also that although IAX is an open standard, the vast majority of telephony platforms implementing IAX are non-



North American Backbone VoIP Protocol Distribution, June 2009

commercial, public domain applications that don't include facilities for active interception capability. This means IAX traffic must be captured passively and doing so requires systems like ours. The speed of IAX adoption is nothing short of amazing. IAX is very different from most VoIP protocols, but its unique characteristics likely drove its adoption. First, it's a binary protocol as opposed to text-based. Second, it doesn't use RTP to carry call content. Instead, it offers a novel approach that aggregates both content and signaling into one stream making it NAT-friendly and vastly more efficient than RTP with two thirds less overhead per packet.

Suffice it to say, much of our engineering time late last year was spent in support of MGCP and IAX development and we're proud to say that we're now the first and only passive capture solution for IAX. We even support IAX's optional trunking configurations. It's been a busy quarter around here, and a productive one for our customers.





OTHER OBSERVATIONS

Enterprises Using Internet VoIP

Thousands of enterprises are using their Internet connections to transmit VoIP to other enterprises and to third-party termination providers. Instead of using their Internet provider's telephony products exclusively, they utilize specialized VoIP service providers for termination and potentially origination. These service providers may be located in other countries and generally support SIP and/or IAX protocols. Very few (less than one percent) of the providers we tested support encryption of signaling or content.

Termination and Origination

Some origination and termination accounts can be purchased in retail locations for cash without requiring verifiable identification for activation. Most service providers can provision telephone numbers in hundreds of locales within seconds through on-line web management interfaces. Most honor client-supplied caller-id information which means their customers can make calls appear to originate from any telephone number. Calling-name (CNAM) service makes this particularly convincing by adding the name portion to the caller-id based upon telephone number lookup only.

Calling Card Operators

Many international streams occur between non-facilities-based VoIP wholesalers who appear to operate calling card services.

NEW IAX CAPABILITIES

Monitoring and Interception

Packet Forensics devices now fully-support the IAX protocol including its trunking capabilities. Targeting IAX calls for interception works the same as our SIP implementation where users can specify telephone numbers and call direction as well as IP addresses, URIs and any of our other advanced policy criteria.

Data Availability and Formats

Users can capture signaling, content or both to satisfy their needs as well as extract dialed digits and other meta-data.

Other Capabilities

Our pen-style reporting has been updated to provide textual details about IAX sessions.

The Packet Forensics direct audio (RTP) player application has been enhanced to include IAX audio mixing, selection and playback, making it even more flexible and useful for VoIP troubleshooting and monitoring.



Technical Details

IAX VoIP Support

IAX / IAX2 (RFC 5456)

In-band audio and dialed digits

In-band trunk meta packets

Direct audio playback support

All Packet Forensics targeting and policy capabilities can be used to target calls and perform other tasks

Operational Configurations

In-line with hardware bypass / failsafe

Tap / Mirror / SPAN

Availability

Available in firmware releases after January 2010 for all platforms

Available under customization program

Contacts



Offices in
Virginia and
Arizona, USA

Headquarters

420 S Smith Rd

Tempe, AZ 85281

United States of America

Telephone & E-mail

Domestic US +1 (800) 807 6140

International +1 (757) 320 2002

salesteam@packetforensics.com



PACKET FORENSICS